CLAIMS

1. A method for avoiding inter-layer inter-symbol interference, **characterised by** the steps of

using a diagonally layered multi-antenna transmission utilising a number of layers;

dividing symbols of each layer into a first number of parts of layers, the number being a multiple of the number of layers;

associating the parts of layers to a second number of transmit antennas such that all antennas transmit an equal number of parts of each layer;

inserting known symbols between the parts to each transmit antenna, a number of known symbols being at least as many as a number of symbol spaced channel taps minus one seen by a receiver to avoid inter-layer inter-symbol interference.

2. The method according to claim 1, **characterised by** the further step of inserting the number of known symbols at the border between the different layers with at least as many as an expected channel memory for a channel observed by a receiver.

3. The method according to claim 2, **characterised by** the further step of inserting the known symbols at the borders between the different layers and also using inserted known symbols also for purposes such as for instance channel estimation or similar purposes.

4. The method according to claim 3, **characterised by** the further step of letting the first number of layers having an equal size.

5. The method according to claim 4, **characterised by** the further step of making the known symbols to constitute a training sequence.

6. The method according to claim 5, **characterised by** the further steps of, in a system having a first and a second transmit antenna, and a

burst structure containing a training sequence in the middle of a burst and with data fields to either side of the training sequence, transmitting a layer one in a left data field and a layer two in a right data field from the first antenna, while transmitting from the second antenna the layer two in the left data field and the layer one in the right data field and from each antenna separating the two layers by the known training sequence to thereby avoid inter-layer inter-symbol interference.

7. The method according to claim 1, **characterised by** the further step of adaptively changing a transmitter algorithm used between layering over one or several antennas depending on a modulation scheme, and/or a code rate of an outer channel code.

8. The method according to claim 7, **characterised by** the further step of using a fixed layering method for header information indicating for instance coding and layering of data.

9. The method according to any one of claims 1 to 8, **characterised by** the further steps of

dividing a transmit antenna array into sub-sets of transmit antennas, each sub-set containing an arbitrary number of transmit antennas;

dividing the layers into sub-sets of layers, each sub-set of layers corresponding to a sub-set of transmit antennas;

diagonally layering the layers within a sub-set, while not permitting layering across different transmit antenna sub-sets.

10. The method according to any one of claims, 1 to 8, **characterised by** the further step of setting up a transmit antenna arrangement constituting an even number of individual antennas, the transmit antenna array being divided into sub-sets of two individual antennas, whereby the layers within a sub-set data are diagonally layered, while not permitting layering across different antenna sub-sets.

11. A system for avoiding inter-layer inter-symbol interference, **characterised in** that

a diagonally layered multi-antenna transmission is used utilising a number of layers;

symbols of each layer are divided into a first number of parts of layers, the number being a multiple of number of layers;

the parts of layers are associated to a second number of transmit antennas such that all antennas transmit an equal number of parts of each layer;

inserting known symbols are inserted at the borders between the parts to each transmit antenna. a number of known symbols being at least as many as a number of symbol spaced channel taps minus one seen by a receiver to avoid inter-symbol interference between the layers.

12. The system according to claim 11, **characterised in** that the number of known symbols inserted at the border between the different layers is at least as many as an expected channel memory for a channel observed by a receiver.

13. The system according to claim 12, **characterised in** that the known symbols, which are inserted at the borders between the different layers can also be used for purposes such as for instance channel estimation or similar desired purposes.

14. The system according to claim 13, **characterised in** that the first number of sub-set have an equal size.

15. The system according to claim 14, **characterised in** that the known symbols constitute a training sequence.

16. The system according to claim 15, **characterised in** that, for a system having a first and a second transmit antenna, and a burst structure containing a training sequence in the middle of a burst and with data fields to either side of the training sequence, a layer one is transmitted in a left data field and a layer two is transmitted in a right data field of the first antenna, while for the second antenna the layer two is transmitted in the left data field and the layer one is transmitted in the right data field thereby separating the two layers by the known training sequence to thereby avoid inter-layer inter-symbol interference.

17. The system according to claim 11, **characterised in** that a transmitter used may adaptively change between layering over one or several antennas depending on a modulation scheme, and/or a code rate of an outer channel code.

18. The system according to claim 17, **characterised in** that one fixed layering method is used for header information, which for instance indicates coding and layering of data

19. The system according to any one of claims 11 to 18, **characterised in** that

a transmit antenna array is divided into sub-sets of transmit antennas, each sub-set containing an arbitrary number of transmit antennas;

the layers are divided into sub-sets of layers, each sub-set of layers corresponding to a sub-set of transmit antennas; and

the layers within a sub-set are diagonally layered while not permitting layering across different transmit antenna sub-sets.

20. The system according to any one of claims, 11 to 18, **characterised in** that a transmit antenna arrangement is set-up constituting an even number of individual antennas, the transmit antenna array being divided

into sub-sets of two individual antennas, whereby the layers within a sub-set data are diagonally layered, while there is no layering across different antenna sub-sets.